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COLLECTING MOLLUSKS ON A BEAM-TRAWLER.

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Collecting mollusks on a beam-trawler while not an ideal way to collect, is nevertheless interesting. These vessels are about 135 feet long, 22 feet beam, tonnage about 150, and run by steam. August 6, 1920, found me on one of these steel boats bound for the Georges Bank. Our first set was made about 118 miles southeast of the Boston light in about 45 fathoms, inside of the Georges Bank proper. The trawl consists of a sweep net about 90 feet wide and 9 feet deep, held apart and in position by two heavy oak doors about three feet by seven feet, shod with heavy iron on one long side. This makes it ride upright and prevents it from wearing as it drags on the bottom. These doors act as kites to the net, as it were, one at each end of the opening, and each hung by a chain bridle to a steel cable. The cables are attached to steam winches which work simultaneously in lowering and pulling in the net. A heavy rope cable about three inches in diameter stretches from door to door and drags on the bottom, acting as a ground line to which the lower edge of the net is fastened. In the center of the net is a large pocket of coarse meshes, but smaller than the meshes of the net proper. This is called the "cod end," and is protected by a blanket of heavy double-meshed netting, so that in dragging on the bottom it will not snag and tear. A portion of the "cod end"

is pursed and tied with a special knot; when the bag is hoisted aboard full of fish a pull on the knot opens the purse and the fish are dumped upon the deck.

The net is "fished" two hours at a time, and the time consumed in hauling, dumping and resetting is very short. The fish are then cleaned and are often all on the ice in the hold in about thirty minutes after being taken from the water. Three to four thousand pounds of good fish at a haul was fair fishing and about the average. Most of the fishing is in water ranging from 30 to 50 fathoms, in a zigzag course across the grounds. The net sweeps nearly everything before it of any size and all goes back into the "cod end." The collection that is dumped upon the deck is therefore miscellaneous in character. From two to three tons of mixed fish, sponges, mollusks and other invertebrates is quite a sight to a collector. Large monk fish, skates, cod, haddock, hake, red snapper, halibut, flounders and sculpins, comprise the principal fish. Owing to the large mesh the majority of the mollusks pass through, leaving only the very large ones or a few of the smaller ones entangled in the net.

Each haul presented three chances to collect. First, when the net comes up; a few minutes of hasty inspection brought to light some fine nudibranchs (*Dendronotus frondosus*) and many little hermit crabs bearing various species of shells and a few very minute shells (*Cingula carinata*) imbedded in the strands of the ground line. Second, the fish are sorted by sluicing them down the deck with a stream of water, the men pushing the refuse fish along with pitch forks and picking out the good ones as this procession goes by, the shells, etc., may be snatched up and not much passes by without being seen. *Pecten magellanicus* Gmel. were sometimes very common, at other times missing. *Cyprina islandica* Linn., *Modiolus modiolus* Linn., *Buccinum undatum* Linn., *Chrysodomus decemcostatus* Say, *Colus stimpsoni* Mörch., *Polinices heros* Say, and the rare *P. levicula* Verr., were taken in this way, and all varied greatly in numbers according to bottom conditions. Some of the *Buccinum* and *Chrysodomus* were unusually large. Attached to some of the *Pecten* were the egg-capsules of *Chrysodomus decemcostatus*, called by the fisher-

men "sea corn." These were described and figured by Mr. Charles W. Johnson, "Occasional Papers," Vol. 5, pp. 1-4. pl. 1, 1921, Boston Society of Natural History. I am indebted to the Society for the cut illustrating these capsules. The third method of collecting is from the fish stomachs as the men were cleaning the fish; I was often able to get a bucket full of material from the haddock, later washing and sifting out the shells, wrapping them in cheese cloth and throwing them into a can of formaline. Sometimes the contents consisted mostly of small crustacea mixed with sand, with but few shells. The cod produced but little in the mollusk line except fragments of *Cyprina* and *Modiolus*, which they had evidently been able to crush. There were also pieces of large gasteropods, probably *Buccinum* and *Chrysodomus*. Crabs, however, seemed to be the main food of the cod. Sometimes the net would come up plastered with large starfish, then it would be a yellow sponge (*Desmacidon palmata*) that the fishermen call "boxing gloves," from their resemblance; another haul would show large numbers of ascidians, the "sea lemons," or the "stemmed sea peaches" (*Pyura*). Many times the net was filled with hydroids, known to the fishermen as "moss," clusters of long rubbery worm-tubes, dubbed by the men "macaroni," as it resembles that product, was very plentiful in one place. Thus the men would say, "we are on the boxing gloves," or on the moss, or in the lemons, or in the macaroni, as the case might be.

The following is a list of species obtained from the fish stomachs, with the exception of *Polypus arcticus*. For their determination I am indebted to Mr. Charles W. Johnson.

Nucula proxima truncula Dall.

Nucula tenuis Montg.

Leda tenuisulcata Couth.

Yoldia limatula Say.

Pecten magellanicus Gmel. (young).

Anomia aculeata Müll.

Anomia simplex Orb.

Modiolus modiolus L. (fragments).

Musculus substriatus Gray.

Musculus corrugatus Stimp.

- Crenella glandula* Totten.
Periploma leanum Conr.
Thracia truncata Migh. & Ads.
Cyprina islandica L. (young).
Astarte portlandica Migh.
Cardium pinnulatum Conr.
Macoma calcarca Gmel. (young).
Ensis directus Conr. (fragments).
Siliqua costata Say (fragments).
Spisula polynyma Stimp. (young).
Saxicava arctica L.
Solariella obscura Couth.
Odostomia sulcosa Migh.
Epitonium groenlandicum Perry.
Epitonium costulatum Migh. & Ads.
Natica clausa Brod. & Sowb.
Polinices heros Say (young).
Polinices triseriata Say.
Polinices immaculata Totten.
Polinices groenlandica Möll.
Velutina undata Brown.
Crepidula plana Say.
Cingula carinata Migh. & Ads.
Turritelopsis acicula Stimp.
Aporrhais occidentalis Beck (young).
Alectrion trivittata Say.
Anachis avara similis Rav.
Buccinum undatum L. (young).
Chrysodomus 10-costatus Say (young).
Colus stimpsonii Mörch. (young).
Colus pygmaeus Gld.
Bela scalaris Möll.
Bela harpularia Couth.
Bela pleurotomaria Couth.
Bela bicarinata Couth.
Retusa pertenuis Migh.
Retusa gouldii Couth.
Cylichna alba Brown.
Polypus arcticus Prosch.